

REMARKS

Claims 1-46 are pending in this application. Claims 1, 10, 20, 21, 30, 34 and 43 are independent claims. Claims 1, 10, 20, 30 and 43 are amended. Reconsideration and allowance of the present application are respectfully requested.

Claim Rejections under 35 U.S.C. §102

Claims 30 and 33 stand rejected under 35 U.S.C. §102(c) as being anticipated by U.S. Patent No. 7,103,325 to Jia et al. (hereinafter “Jia”). This rejection is respectfully traversed.

As outlined below, Jia does not teach or suggest each of the elements of claims 30 and 33.

Jia discloses the selection of a space-time encoding mode for use when transmitting with spatial diversity based on the receive diversity associated with a receiver device and the quality of the transmission channels based on information fed back from the receiver device. The selectable space-time encoding modes are preferably space-time transmit diversity encoding and a version of BLAST-type encoding. During operation, the transmitter continuously monitors the quality of channel conditions, and based on the diversity of the receiver device, will dynamically select the space-time encoding mode, modulation mode, and error correction encoding most appropriate for current conditions. The space-time encoding mode selection is applicable in a wide variety of wireless communication environments in both uplink and downlink modes. As such, both base stations and mobile terminals can take advantage of the adaptive modulation and coding. See at least Col. 2, lines 32-61 of Jia.

Applicant submits that Jia does not teach or suggest each of the elements recited in claims 30 and 33. Independent claim 30, upon which claims 31-33 depend, recites “a baseband processor circuit capable of handling data transmissions during a first operating mode in a channel between a first access point and a second access point; and a multi-antenna signal processing circuit capable of handling data transmissions during a second operating mode in said channel, wherein the baseband processor is capable of operating substantially simultaneously with the multi-antenna signal processing circuit.” Jia does not teach or suggest these features.

As noted above and acknowledged by the Office Action in the following rejection, Jia does not teach or suggest simultaneously handling data transmissions in more than one mode. While Jia does disclose that there are a plurality of space-time encoding modes to choose from, only one mode is chosen, at a time, for data transmission in Jia. Therefore, Applicant submits that Jia does not teach or suggest “a baseband processor circuit capable of handling data transmissions during a first operating mode in a channel between a first access point and a second access point; and a multi-antenna signal processing circuit capable of handling data transmissions during a second operating mode in said channel, wherein the baseband processor is capable of operating substantially simultaneously with the multi-antenna signal processing circuit,” as recited in claim 30. Claim 33 depends on claim 30 and therefore incorporates all of the elements of claim 30, in addition to the further elements recited in claim 33. Therefore, Applicant respectfully requests that this rejection of claims 30 and 33 under 35 U.S.C. §102 be withdrawn.

Claim Rejections Under 35 U.S.C. §103

Claims 1-5, 8 and 9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of U.S. Patent Publication No. 2002/0132600 to Rudrapatna (hereinafter “Rudrapatna”) and in further view of U.S. Patent Publication No. 2004/0082356 to Walton et al. (hereinafter “Walton”). This rejection is respectfully traversed.

As outlined below, the combination of Jia, Rudrapatna and Walton does not teach or suggest the combination of elements recited in claims 1-9.

Rudrapatna discloses an antenna array including at least two groups of antennas where each group comprises at least two pairs of antennas. The antenna array further includes circuitry coupled to the antenna groups to select and activate certain antennas in a group to enable the antenna array to operate in either beam forming/steering mode, diversity mode, MIMO mode or any combination thereof. The antennas in the groups are activated based on the characteristics of the signals being transmitted or received by the antenna array. See at least the Abstract.

Walton discloses a multiple-access MIMO WLAN system that employs MIMO, OFDM, and TDD. The system (1) uses a channel structure with a number of configurable transport channels, (2) supports multiple rates and transmission modes, which are configurable based on

channel conditions and user terminal capabilities, (3) employs a pilot structure with several types of pilot for different functions, (4) implements rate, timing, and power control loops for proper system operation, and (5) employs random access for system access by the user terminals, fast acknowledgment, and quick resource assignments. See at least the Abstract of Walton.

Applicant submits that the combination of Jia, Rudrapatna and Walton does not teach or suggest the combination of elements recited in claims 1-9. As acknowledged in the Office Action, Jia fail to teach or suggest “a multi-antenna signal processing circuit situated in a first access point and adapted to: operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition, and said multi-antenna signal processor handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition,” as recited in independent claim 1. However, the Office Action alleged that Rudrapatna cures this deficiency of Jia.

In Rudrapatna, as noted above, the antenna array is configured to operate in either beam forming/steering mode, diversity mode, MIMO mode or any combination thereof. So, although Rudrapatna discloses that two modes of operating simultaneously, the simultaneous operations are performed in the antenna array. In the present invention, on the other hand, “the first baseband processor handles data transmissions in a first mode ... and said multi-antenna signal processor handles data transmissions in a second mode,” as recited in claim 1. So, in the present invention, the simultaneous operations are performed by the first baseband processor and the multi-antenna signal processor.

If one skilled in the art were to combine the teachings of Rudrapatna with Jia, one skilled in the art would modify the antenna elements of Jia to operate simultaneously. However, such modification would not result in the antenna elements of Jia operating simultaneously with the baseband processor element. Therefore, the combination of Jia and Rudrapatna fails to teach or suggest “a multi-antenna signal processing circuit situated in a first access point and adapted to: operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition, and said multi-antenna signal processor

handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition,” as recited in claim 1, upon which claims 2-9 depend.

Independent claim 1, in part, also recites “receive M independent RF modulated input signals from said second access point when the second channel transmission mode exists between the first access point and said second access point; and process said M independent RF modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by said second access point, wherein said multi-antenna signal processing circuit operates selectively with a first baseband processor to demodulate RF signals received in a channel from a second access point.” Jia also does not teach these features.

The Office Action alleged that Walton cures these deficiencies of Walton. Although paragraph 218 of Walton discloses that transmitted uplink signals are received by antennas, demodulated by demodulators and processed by an RX spatial processor and RX data processor, there is no teaching or suggestion in Walton of receiving “M independent RF modulated input signals from said second access point when the second channel transmission mode exists between the first access point and said second access point,” as recited in claim 1. (Underlining added. There is also no teaching or suggestion in Walton that the “multi-antenna signal processing circuit operates selectively with the first baseband processor to demodulate RF signals received in a channel from the second access point,” as recited in claim 1.

Therefore, Applicant submits that the combination of Jia, Rudrapatna and Walton fails to teach or suggest each of the elements recited in claim 1. Each of claims 2-5, 8 and 9 depends on claim 1 and therefore incorporates all of the elements of claim 1, in addition to the further elements recited in claims 2-5, 8 and 9. Therefore, Applicant respectfully requests that this rejection of claims 1-5, 8 and 9 under 35 U.S.C. §103 be withdrawn.

Claims 6, 10, 17 and 18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia and Rudrapatna in view of Walton and in further view of U.S. Patent No. 7,126,926 to Bjorklund et al. (hereinafter “Bjorklund”). This rejection is respectfully traversed.

As outlined below, the combination of Bjorklund, Rudrapatna, Jia and Walton does not teach or suggest each of the elements of claims 6, 10, 17 and 18.

Bjorklund discloses a multi-tier system for digital radio communication. The multi-tier system has a first-tier base station with relatively long-range radio and has a second-tier base station with relatively short-range, low power and cheaper radios. The system can be configured to meet demands of various applications. The application may include data capture using bar code readers, radio frequency readers and other automatic data capture devices. See at least the Abstract of Bjorklund.

Applicant submits that the combination of Bjorklund, Rudrapatna, Jia and Walton does not teach or suggest each of the elements of claims 6, 10, 17 and 18. Independent claim 1, in part, recites “a multi-antenna signal processing circuit situated in a first access point and adapted to: operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition, and said multi-antenna signal processor handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition.”

Independent claim 10, in part, recites “a first access point and adapted to: (a) operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition, and said multi-antenna signal processor handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition.” As noted above, the combination of Rudrapatna, Jia and Walton does not teach or suggest these features.

Bjorklund also does not cure these deficiencies of Jia, Rudrapatna, and Walton, as outlined above. Specifically, Bjorklund also does not teach or suggest “a multi-antenna signal processing circuit situated in a first access point and adapted to: operate simultaneously with a first baseband processor ... the first baseband processor handles data transmissions in a first mode ... and said multi-antenna signal processor handles data transmissions in a second mode,” as recited in claims 1 and 10. Bjorklund also does not teach or suggest “receive M independent RF modulated input signals from said second access point when the second channel transmission mode exists between the first access point and said second access point ... wherein said multi-antenna signal processing circuit operates with a first baseband processor to receive and transmit

RF signals in a channel between said first access point and said second access point,” as recited in claims 1 and 10. Each of claims 6, 10, 17 and 18 depends on claims 1 and 10 and therefore incorporates all of the elements of claims 1 and 10, in addition to the further elements recited in claims 6, 10, 17 and 18. Therefore, Applicant respectfully requests that this rejection of claims 6, 10, 17 and 18 under 35 U.S.C. §103 be withdrawn.

Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Jia and Rudrapatna in view of Walton. and in further view of U.S. Patent No. 7,006,464 to Gopalakrishnan et al. (hereinafter “Gopalakrishnan”). This rejection is respectfully traversed.

Gopalakrishnan does not cure the deficiencies of Jia, Rudrapatna, and Walton, as noted above with respect to claim 1, upon which claim 7 depends. Specifically, Gopalakrishnan does not teach or suggest “a multi-antenna signal processing circuit situated in a first access point and adapted to: operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition, and said multi-antenna signal processor handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition,” as recited in independent claim 1 upon which claim 7 depends.

Gopalakrishnan also does not teach or suggest receiving “M independent RF modulated input signals from said second access point when the second channel transmission mode exists between the first access point and said second access point; and process said M independent RF modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by said second access point, wherein said multi-antenna signal processing circuit operates selectively with a first baseband processor to demodulate RF signals received in a channel from a second access point,” as recited in independent claim 1 upon which claim 7 depends. Therefore, Applicant respectfully requests that this rejection of claim 7 under 35 U.S.C. §103 be withdrawn.

Claims 11-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia, Rudrapatna and Walton in view of Bjorklund and further in view of U.S. Patent No. 7,046,651 to

Terry (hereinafter “Terry”). Claims 14-16 and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia, Rudrapatna and Walton in view of Bjorklund and further in view of U.S. Patent Publication No. 2004/0219937 to Sugar et al. (hereinafter “Sugar”). These rejections are respectfully traversed.

Sugar and Terry do not cure the deficiencies of Jia, Rudrapatna, Walton and Bjorklund, as noted above with respect to claim 10, upon which claims 11-16 and 19 depend. Specifically, neither Sugar nor Terry, whether taken singly or combined, teaches or suggests “a first access point and adapted to: (a) operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition, and said multi-antenna signal processor handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition,” as recited in claim 10, upon which claims 11-16 and 19 depend.

Neither Sugar nor Terry also teaches or suggests “receive M independent RF modulated input signals from said second access point when the second channel transmission mode exists between the first access point and said second access point; and process said M independent RF modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by said second access point, wherein said multi-antenna signal processing circuit operates selectively with a first baseband processor to demodulate RF signals received in a channel from a second access point,” as recited in claim 10, upon which claims 11-16 and 19 depend. Therefore, Applicant respectfully requests that these rejections of claims 11-16 and 19 under 35 U.S.C. §103 be withdrawn.

Claim 20 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Walton and in further view of Sugar. This rejection is respectfully traversed.

As noted above, none of the cited references teaches or suggests “a radio frequency (RF) multi-antenna access point circuit comprising: a baseband processor circuit for handling data transmissions during a first operating mode in a channel between a first access point and a second access point; a multi-antenna signal processing circuit for handling data transmissions

during a second operating mode in said channel, wherein the baseband processor is capable of operating substantially simultaneously with the multi-antenna signal processing circuit,” as recited in claim 20. Therefore, Applicant respectfully requests that this rejection of claim 20 under 35 U.S.C. §103 be withdrawn.

Claims 21, 22, 25, 29, 34, 35, 38 and 42 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Rudrapatna. This rejection is respectfully traversed.

As noted above, neither Jia nor Rudrapatna teaches or suggests “a multi-antenna signal processing circuit situated in a first access point and adapted to: operate simultaneously with a first baseband processor ... the first baseband processor handles data transmissions in a first mode ... and said multi-antenna signal processor handles data transmissions in a second mode, wherein the baseband processor is capable of operating substantially simultaneously with the multi-antenna signal processing circuit,” as recited in independent claims 21, 34 and 35, upon which claims 22, 25, 29, 38 and 42 depend. Therefore, Applicant respectfully requests that this rejection of claims 21, 22, 25, 29, 34, 35, 38 and 42 under 35 U.S.C. §103 be withdrawn.

Claims 26, 27, 39 and 40 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Rudrapatna and in further view of Bjorklund. This rejection is respectfully traversed.

As noted above, neither Jia, Rudrapatna nor Bjorklund teaches or suggests “a multi-antenna signal processing circuit situated in a first access point and adapted to: operate simultaneously with a first baseband processor ... the first baseband processor handles data transmissions in a first mode ... and said multi-antenna signal processor handles data transmissions in a second mode, wherein the baseband processor is capable of operating substantially simultaneously with the multi-antenna signal processing circuit,” as recited in independent claims 21 and 35, upon which claims 26, 27, 39 and 40 depend. Therefore, Applicant respectfully requests that this rejection of claims 26, 27, 39 and 40 under 35 U.S.C. §103 be withdrawn.

Claims 28 and 41 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Rudrapatna and in further view of Terry. This rejection is respectfully traversed.

As noted above, neither Jia, Rudrapatna nor Terry teaches or suggests “a multi-antenna signal processing circuit situated in a first access point and adapted to: operate simultaneously with a first baseband processor ... the first baseband processor handles data transmissions in a first mode ... and said multi-antenna signal processor handles data transmissions in a second mode, wherein the baseband processor is capable of operating substantially simultaneously with the multi-antenna signal processing circuit,” as recited in independent claims 21 and 35, upon which claims 28 and 41 depend. Therefore, Applicant respectfully requests that this rejection of claims 28 and 41 under 35 U.S.C. §103 be withdrawn.

Claims 31 and 32 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Rudrapatna and in further view of Walton. This rejection is respectfully traversed.

As noted above, neither Jia, Rudrapatna nor Walton teaches or suggests “a multi-antenna signal processing circuit situated in a first access point and adapted to: operate simultaneously with a first baseband processor ... the first baseband processor handles data transmissions in a first mode ... and said multi-antenna signal processor handles data transmissions in a second mode, wherein the baseband processor is capable of operating substantially simultaneously with the multi-antenna signal processing circuit,” as recited in independent claim 30, upon which claims 31 and 32 depend. Therefore, Applicant respectfully requests that this rejection of claims 31 and 32 under 35 U.S.C. §103 be withdrawn.

Claims 43 and 46 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Sugar. Claims 44 and 45 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Sugar and in further view of Walton. These rejections are respectfully traversed.

As noted above, neither Jia nor Sugar teaches or suggests “a multi-antenna signal processing circuit situated in a first access point and adapted to: operate simultaneously with a first baseband processor ... the first baseband processor handles data transmissions in a first mode ... and said multi-antenna signal processor handles data transmissions in a second mode,

wherein the baseband processor is capable of operating substantially simultaneously with the multi-antenna signal processing circuit,” as recited in independent claim 43, upon which claims 44-46 depend. Therefore, Applicant respectfully requests that this rejection of claims 43-46 under 35 U.S.C. §103 be withdrawn.

Disclaimer

Applicant may not have presented all possible arguments or have refuted the characterizations of either the claims or the prior art as found in the Office Action. However, the lack of such arguments or refutations is not intended to act as a waiver of such arguments or as concurrence with such characterizations.

CONCLUSION

In view of the above, consideration and allowance are respectfully solicited.

In the event the Examiner believes an interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

The Office is authorized to charge any necessary fees to Deposit Account No. 22-0185.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 22-0185, under Order No. 27592-00275-US6 from which the undersigned is authorized to draw.

Dated: January 12, 2009

Respectfully submitted,

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